An Analysis of Changing Instrumentation on the Dew Point Record in Iowa

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Overview

- Background
- History of observations
- Types of instruments
- Procedure
- Results

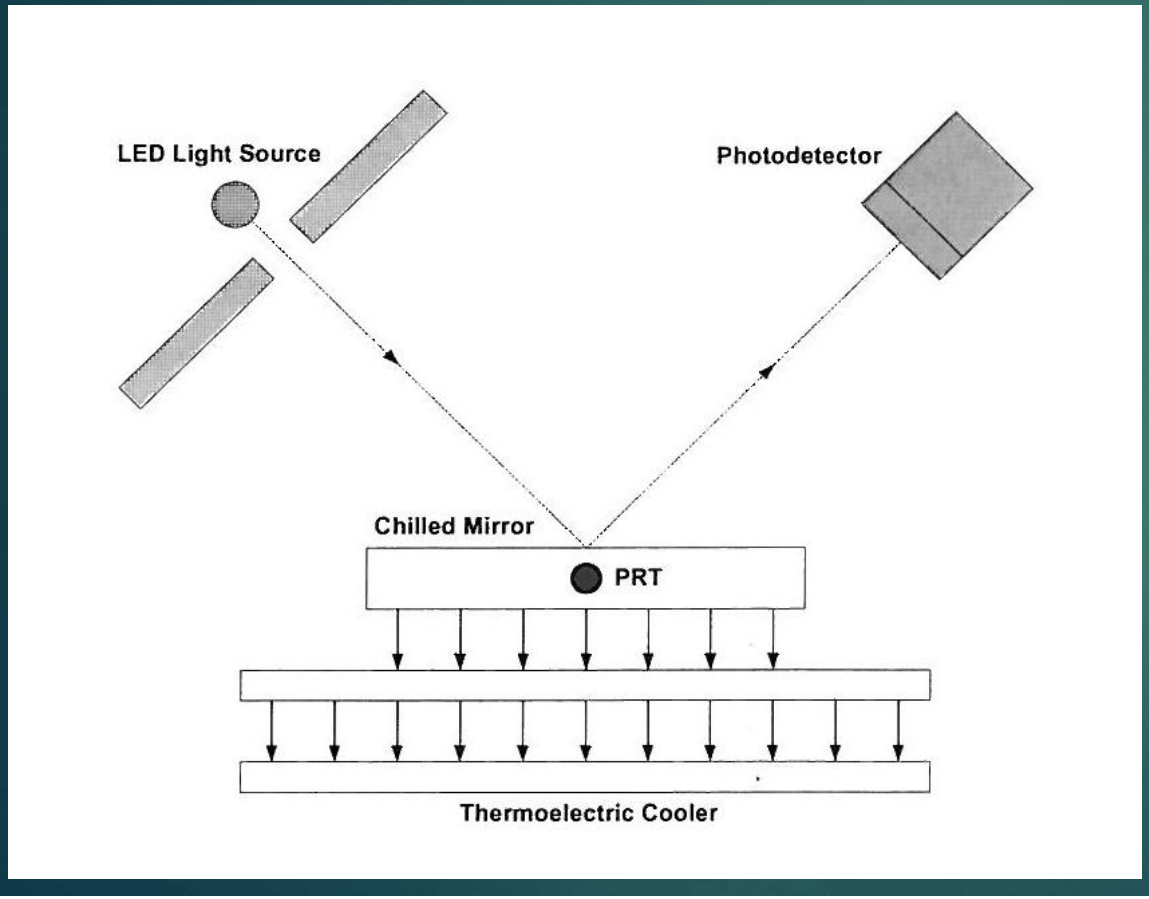
Background

- Senior meteorology thesis: dew points are rising across the state
- Wanted to make sure instrument changes had no effect

Airport Instrumentation History

- HO 60 hygrothermometer
- 1985 - HO 83 hygrothermometer
- 1995 - ASOS
- 2006 - ASOS upgrade: DTS1 dew point sensor

Chilled Mirror Hygrometer



- Mirror is cooled until dew temperature is reached
- A light is pointed at the mirror, when dew forms the light is dispersed in
- This indicates the dew temperature

DTS1 Dew point sensor

- Measures relative humidity and outputs dew point temperature through a calculation
- Installed to reduce the maintenance costs of the chilled mirror hygrometer

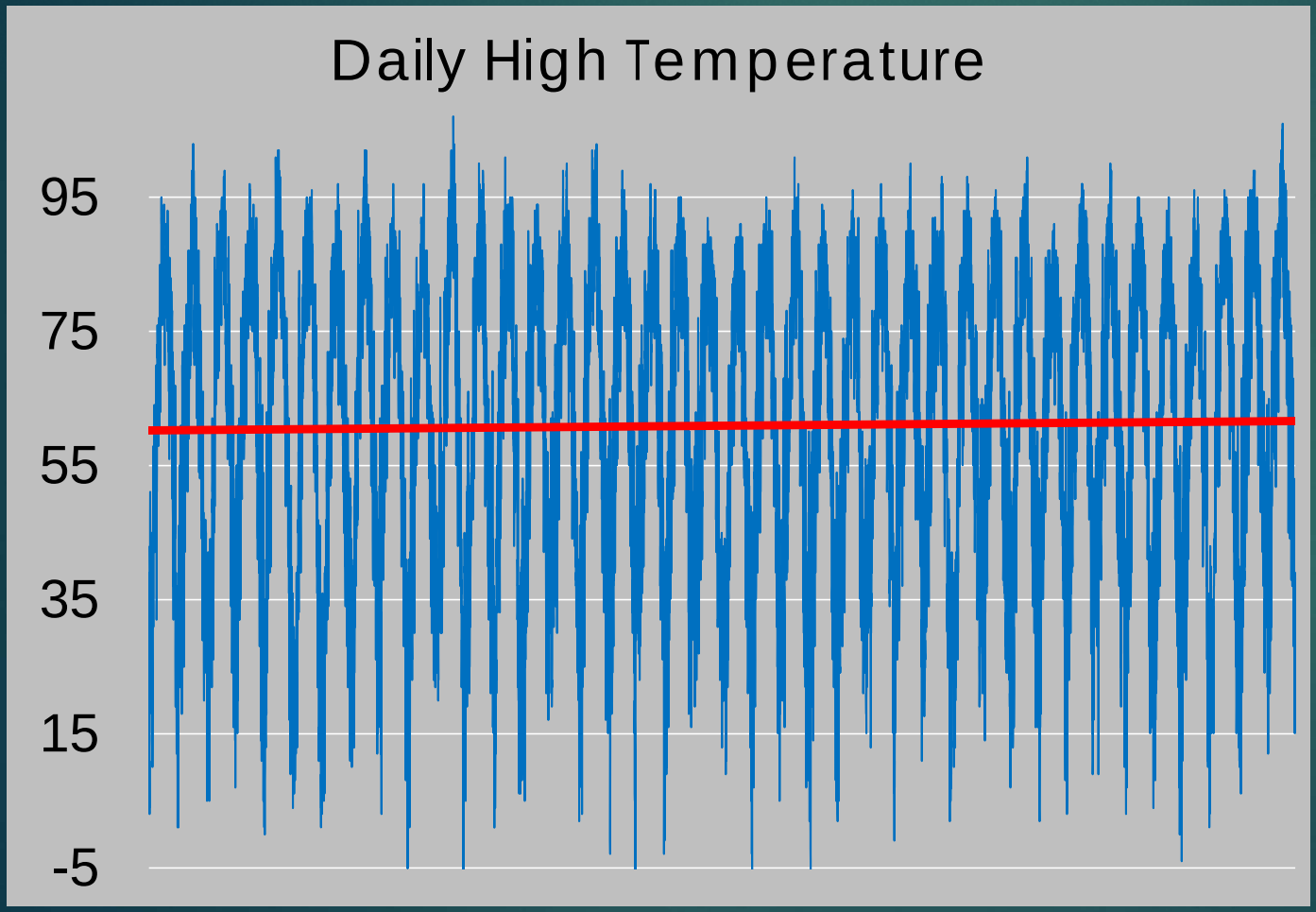
Data

- Obtained from Iowa Environmental Mesonet
- Record is from 1973 to 2012
- A few days were missing; filled in with high/low from NWS Coop
- Dew points were estimated from surrounding days

Procedure

- Special thanks to Lendie Follett
- Statistical models fit to each separate instrument period
- These models detrended the data and obtained the variability

Results – High Temperature

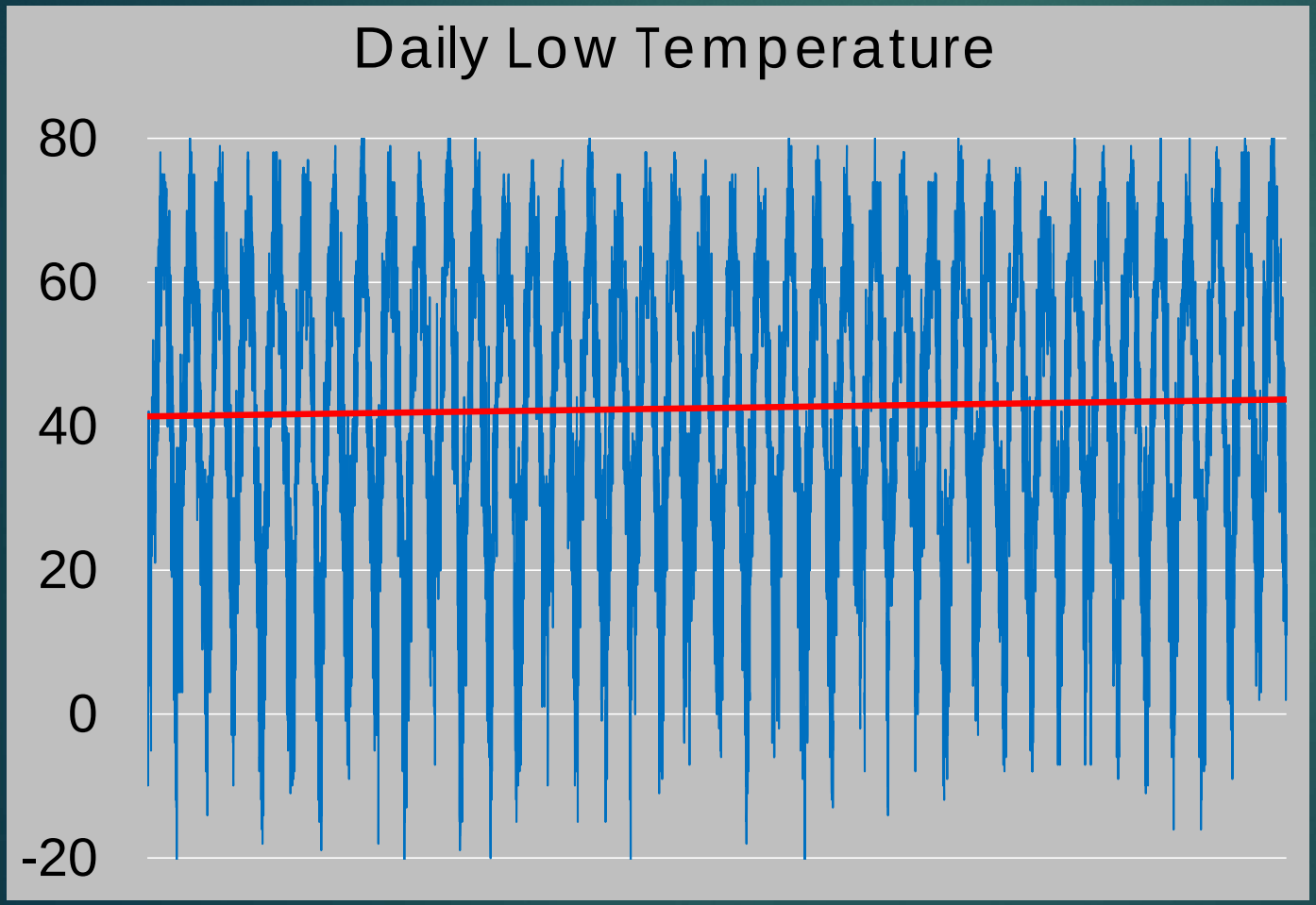


Instrument	Standard Dev.
Ho 60	7.0
Ho 83	7.3
ASOS	7.2
DTS1	7.1

Slope = 0.0001

R^2 = 0.0003

Results - Low Temperature

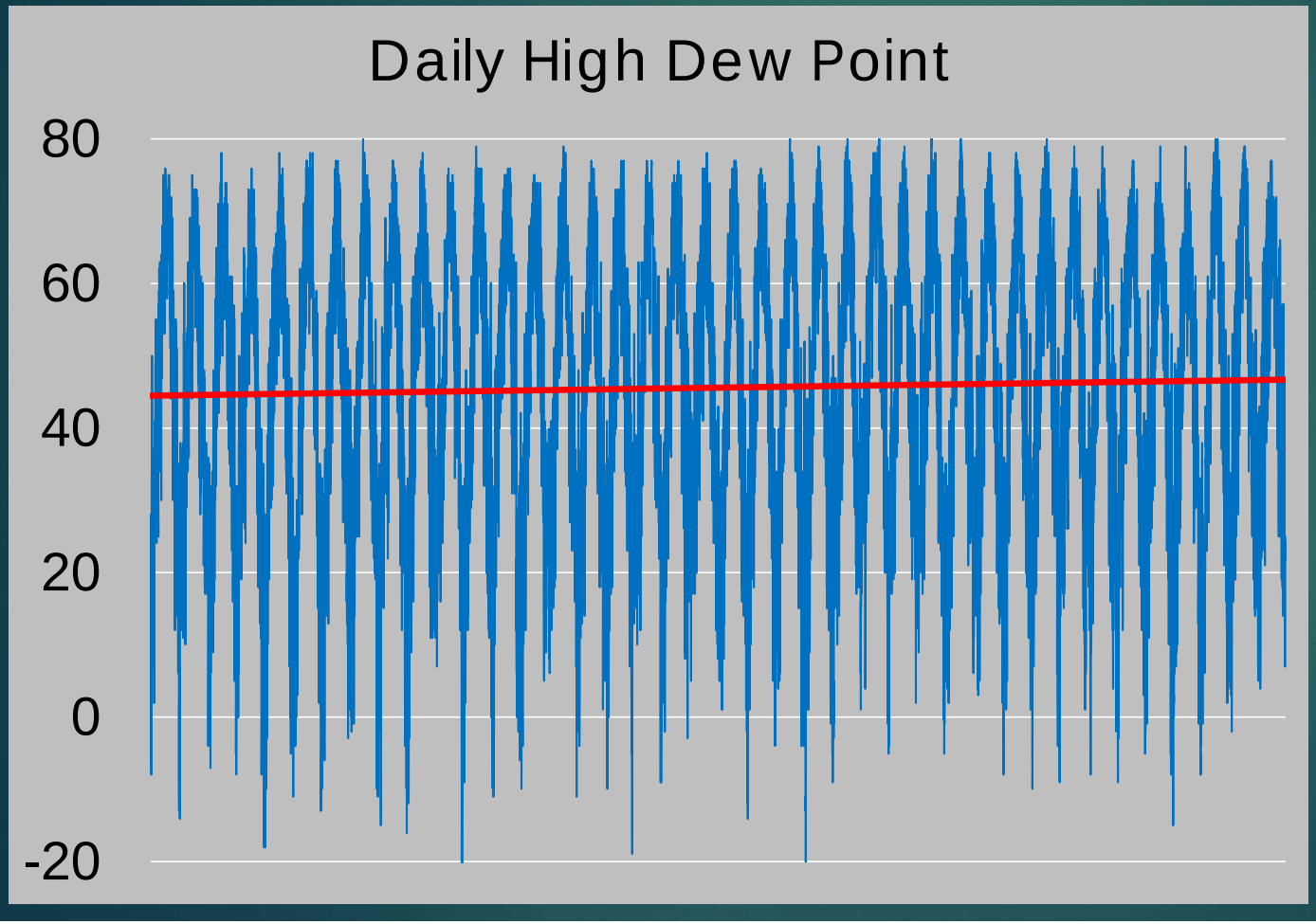


Instrument	Standard Dev.
Ho 60	7.3
Ho 83	7.3
ASOS	7.1
DTS1	6.9

Slope = 0.0002

R^2 = 0.0011

Results – High Dew Point

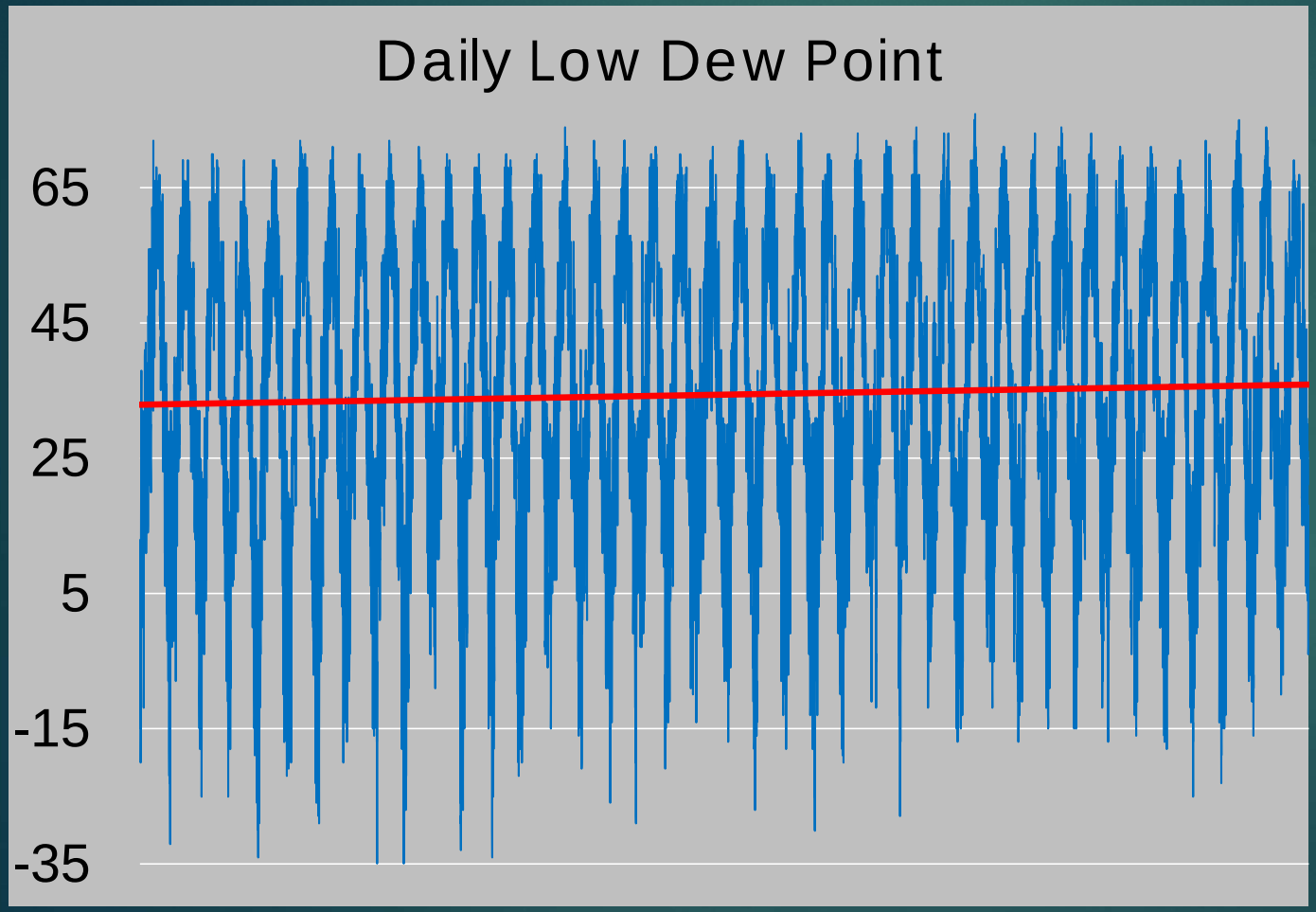


Instrument	Standard Dev.
Ho 60	7.5
Ho 83	7.4
ASOS	7.3
DTS1	7.4

Slope = 0.0002

R^2 = 0.0011

Results - Low Dew Point



Instrument	Standard Dev.
Ho 60	7.5
Ho 83	7.3
ASOS	7.2
DTS1	7.1

Slope = 0.0002

R^2 = 0.0017

Summary

- No changes were observed from one instrument to another
- This is a good thing; the NWS relies on having each new instrument compatible with the rest of the record

Questions?